INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT

ACID INSOLUBLE CONTENT OF FINE AGGREGATES
ITM No. 202-08T

1.0 SCOPE.

1.1 This test method covers the procedure for quantitative determination of the acid insoluble content of fine aggregates used in HMA.

1.2 The fine aggregate is crushed or ground to a fineness sufficient to pass through a No. 30 (600 µm) sieve. A dried sample is dissolved and digested in dilute acid, filtered, and the washed and dried residue weighed back as the insoluble fraction.

1.3 The values stated in either acceptable English or SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other, without combining values in any way.

1.4 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

M 92 Wire-Cloth Sieves for Testing Purposes
M 231 Weighing Devices Used in the Testing of Materials

2.2 ASTM Standards.

D 1193 Reagent Water
E 960 Laboratory Glass Beakers
E 1406 Laboratory Glass Filtering Flasks
E 145 Gravity-Convection and Forced-Ventilation Ovens

2.3 OTHER Standards.

Reagent Chemicals, American Chemical Society Specifications

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specification, Section 101.

4.0 SIGNIFICANCE AND USE. This ITM is used to verify the minimum specification requirements for acid insoluble content of fine aggregates used in HMA.

5.0 APPARATUS.

5.1 Sieve, No. 30 (600 µm), conforming to the requirements of AASHTO M 92

5.2 Mechanical crusher or mortar and pestle

5.3 Drying oven, capable of operation at 210 to 260°F (100 to 125°C*)* in accordance with ASTM E 145

5.4 Analytical balance, Class A, conforming to the requirements of AASHTO M 231

5.5 Dessicator, glass, with dessicant

5.6 250 mL griffin low form borosilicate glass beakers in accordance with ASTM E 960, Type I

5.7 Erlenmeyer vacuum flask, borosilicate glass, in accordance with ASTM E 1406, Type III, Class 2, with crucible holder

5.8 Vacuum pump or other vacuum source

5.9 Ceramic or glass gooch filtering crucibles, medium porosity fritted disc, 25 mL minimum capacity

5.10 Hot plate, electrical, with heat control

5.11 Chemical fume hood

6.0 REAGENTS.

6.1 Purity of Reagents. Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society.

6.1.1 Hydrochloric acid, concentrated

6.1.2 Methanol

6.2 **Purity of Water.** Unless otherwise indicated, references to water shall be Type II reagent water in accordance with ASTM D 1193.

7.0 SAMPLE PREPARATION.

7.1 Separate 100 g of the material to be tested on a No. 30 (600 µm) sieve.

7.2 Crush or grind the portion retained on the sieve, by means that will not contaminate the sample, until substantially all of the material passes the sieve.

7.3 Combine all portions of the original 100 g material.

7.4 Quarter this material until approximately 10 g are obtained as a representative sample.

7.5 Dry the sample at 221 ± 9°F (105°C ± 5°C) for at least 2 h.

7.6 Remove the sample from the oven and place in desiccator to cool at least 2 h.

8.0 PROCEDURE.

8.1 Weigh two portions of the dried sample of approximately 2.5 g each to 0.0001 g, and transfer separately into 250 mL beakers.

8.2 In a chemical fume hood add to each beaker 75 mL of water and 25 mL of concentrated hydrochloric acid.

8.3 When the initial effervescent reaction has subsided, stir and heat on a hot plate to a boil.

8.4 Remove the beaker from the hot plate and allow to stand at room temperature for 2 h.

8.5 Filter the solution on vacuum through a tared, dried, medium porosity, fritted-disc crucible, retaining the filtrate in a clean flask. If the filtrate is cloudy, refilter.

8.6 Wash the residue four times with water and once with methanol.

8.7 Dry the crucible and residue at 248 ± 9°F (120°C ± 5°C) for 3 h, or at 221 ± 9°F (105°C ± 5°C) overnight.

8.8 Cool the sample at least 2 h in a desiccator and weigh to 0.0001 g.

9.0 CALCULATIONS. The percent of acid insoluble content is calculated by the following formula:

$$\text{Acid Insoluble Content, \%} = \frac{(W_3 - W_2)}{W_1} \times 100$$

where:

W_1 = weight (mass) of the dried sample
W_2 = weight (mass) of the crucible
W_3 = weight (mass) of crucible and residue

10.0 REPORT. The average of duplicate determinations shall be reported to the nearest 0.1%.